

Diversity And Indigenous Knowledge About The Use Of Wild Edible Plants As Food By The K'ho Community In Bidoup-Nui Ba National Park, South Vietnam

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Abstract – Wild edible plants are the primary food source used by communities in National Parks, Nature Reserves, and natural forests for their daily meals. Based on the combination of the household survey method with the Participatory Rapid Assessment (PRA) and a transect investigation, we discovered the knowledge about the use of wild edible plants of the K'Ho people in the Bidoup-Nui Ba National Park, Lam Dong Province. A total of 73 species, 66 genera of 47 families belonging to three phyta, were used as food by the K'Ho people. Nine life forms and eight parts of edible plants have been identified, herbaceous and leave with the highest number of species used by the locals. These species were most commonly found in primary and secondary forests, while others were scattered in pine, swamp, and bamboo forests. The study showed that young people know little about edible plants, while middle-aged and older adults know much about them. The locals have used nine food type groups: soup and vegetable, cooking groups. Cooking soup, boiling, and eating fresh were the most common processing methods. Nine kinds of edible plants were planted in their home gardens.

Keywords – Plant diversity, Wild edible plants, indigenous knowledge, Bidoup-Nui Ba National Park.

I. INTRODUCTION

The Bidoup-Nui Ba National Park was known as one of the four biodiversity centres in Vietnam. A total of 6 major forest ecosystem types and 1,945 vascular plant species were recorded; of which 205 were rare and threatened, 91 species were just under endemic. In 2020, 15 new plant species were announced for science, 14 designated *dioupensis* and *hongiaoensis* as *Ilex bidoupensis*, *Neolitsea hongiaoensis*, *Nyssa bidoupensis*, *Eriobotrya hongiaoensis*, *Symplocos hongiaoensis*, *Prunus hongiaoensis*, etc. [1]. In the first six months of 2021, 4 new species were recorded for science: *Camellia flosculora* [2], *Camellia bidoupensis*, *Begonia hongiaoensis* and *Begonia lamdongiana* [3].

Besides various resources, Bidoup-Nui Ba National Park is considered the typical home for many ethnic groups, the K'Ho community. They learned to rely on the forest by collecting species for daily life, in which wild plants play the leading role.

Wild edible plants distributed in nature are the source of food in the daily meals of indigenous communities and provide and supplement essential nutrients and vitamins for the body [4]. Exploiting wild edible plants for food is a popular livelihood activity for ethnic minorities who live near forests. The K'ho people are one of them. The K'ho are an ethnic group living in the Bidoup - Nui Ba National Park, with around 3,645 households (77.67% of the total households) [5]. In the course of the history of existence and development, generations of K'ho people have gained experience and built up a vibrant system of knowledge about the use of edible plants [4]. The typical dishes imbued with the traditional cooking culture of the K'Ho people were known as sour porridge, sour soup, leaves of *Gnetum gnemon* var. *griffithii* cooked buffalo meat, Biep pu, roasted rattan, etc. were processed

from wild plants in nature [4]. This knowledge was formed, preserved, and further developed with the K'ho people and has lived in harmony with the forest for generations. However, over time, the introduction of culture, technology, and indigenous knowledge of the K'ho people is fading, and this harmony faces many challenges. With the loss of the older generation in the community, a wealth of knowledge is also lost.

This study aims to answer the questions: (i) Which wild edible plants are used as food by the local population? ii) How is indigenous knowledge about edible plants put into practice?

II. MATERIALS AND METHODS

2.1. Study area

The study was conducted from 11/2016 to 5/2017 and 1/2021 in the Bidoup-Nui Ba National Park in Lam Dong province (from 12°00'00" to 12°52'00" N and 108°17'00" to 108°42'00" E). The National Park was established by the Decision of Prime Minister No. 1240/QĐ-TTĐ of November 19, 2004, with a total natural area of currently 70,038.75 hectares. Middle mountains characterize the topography. The highest is the Bidoup peak (2,287m). The climate is the monsoon in the Central Highlands, the average annual temperature 18°C, the average annual rainfall 1,755mm, the average annual humidity of 75% to 85% [5]. The diversity of topography, climate, hydrology, and land creates the diversity of fauna, flora, and humanity in the region. This is one of the main reasons for the abundance of indigenous knowledge systems in the study area.

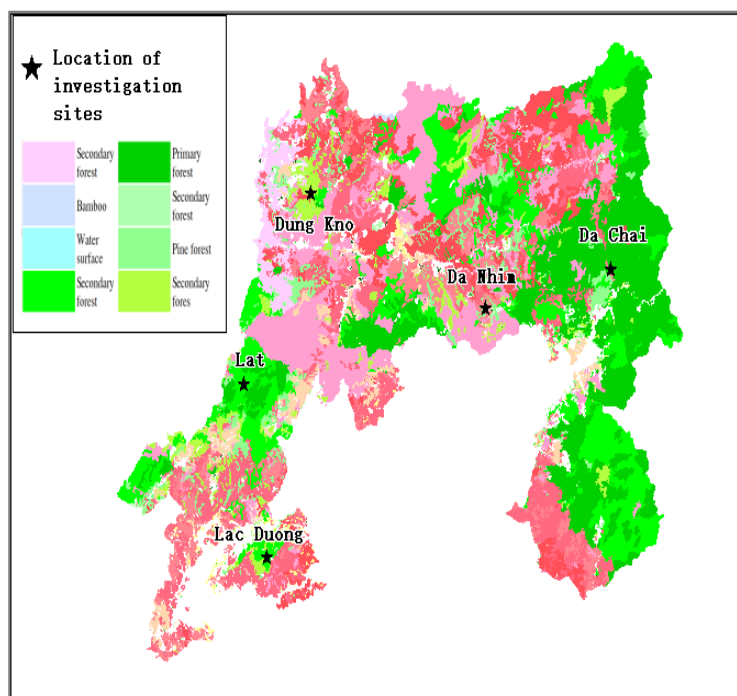


Figure 1. Location of investigation sites

2.2. Materials and methods

2.2.1. Fieldwork

After a preliminary investigation of the study area, a transect investigation was set up in the communes of Dung Kno, Da Nhim, Lat, Da Chai and Lac Duong (Figure 1) to identify the edible plant species in different habitats according to the instructions of the K'Ho people. The selected people are the ones who determine which types of plants are harvested and how they are processed, indigenous experts, village elders, and other locals who knew about edible plant species. The importance of edible plant species was determined through the use of standard Participatory Rural Appraisal (PRA) techniques Martin (1995) [6], among the locals were then asked to organize the list of commonly used edible plants. A total of 99 critical informants between the ages of 18 and over 60 were interviewed separately. All plants that have been collected and used for food by the locals have

been collected and identified. These trees include species in nature and wild plants that come from forests and are planted in gardens. The information was collected, including species names (Vietnamese names, K'ho names), numbers and parts used (stem, root, tuber, leaves, shoot, flower, fruit, seed, etc.), life forms, distribution, processing of food from edible plants.

2.2.2. Data analysis

The local name (name K'ho) was identified at the scene by local people who have experience collecting and using wild edible plants for food. The common names were identified in the field by expert plant taxonomists. For undetermined species, they were sampled, and morphological comparisons were used to determine the species name. These botanical samples were compared with descriptions based on the literature as An Illustrated Flora of Vietnam, Volumes 1-3 [7]; 1,900 useful plant species of Vietnam [8]; Non-timber forest products in Vietnam [9], Plants of the World Online [10]. The species' scientific name was identified and regulated by Plants of the World Online [10], World flora online [11]. A species list was created using the taxonomy systems of Brummitt (1992). The variety of parts used and processed dishes was determined by interviewing individuals who have experience collecting plants for food by K'Ho people, followed by data synthesis and analysis. The life forms of plants were determined from the document An Illustrated Flora of Vietnam, Volumes 1-3 [7]. The distribution of species by habitat was determined based on experience collecting and using plants as food for the K'Ho people. GPS, a forest status map of the Bidoup-Nui Ba National Park, was also used.

III. RESULTS AND DISCUSSIONS

3.1. Species diversity of wild edible plants

3.1.1. Edible plant species component

We found a total of 73 edible plants belonging to 66 genera 47 families of three phyta (Polypodiophyta, Pinophyta, and Magnoliophyta) that the K'Ho used as food in the Bidoup-Nui Ba National Park. The species composition of the wild edible plants is lower in the present study than that in the study by Hop *et al.* (2020) [4], who reported 93 species in Nam Ban Forest in Lam Dong Province. We also found that the composition of edible plants was unevenly distributed across the taxonomic levels. Most of the registered species belong to Magnoliophyta (over 95% of the totality of the species) (70 species, 63 genera, and 44 families); only one species, one genus, and one family of Pinophyta; In meantime, two species, two genera, two families belonging to Polypodiophyta. This finding is supported by Hop *et al.* (2020) [4]. This study concluded that most of the food plants belong to the Orchidaceae (over 93% of all taxa), the rest are other phyta (Table 1).

Table 1. The composition of edible plants was used by the K'ho ethnic

No.	Scientific name	Vietnamese name	K'ho name	Family name	Parts used
I	Polypodiophyta				
1	<i>Diplazium esculentum</i> (Retz.) Sw.	Dón	K' tởn	Aspleniaceae	Stems, young shoots
2	<i>Ceratopteris thalictroides</i> (L.) Brongn.	Ráng gặt nai	Biệp crông	Pteridaceae	young shoots
II	Pinophyta				
3	<i>Gnetum gnemon</i> var. <i>griffithii</i> (Parl.) Markgraf	Lá bép	Biap sê	Gnetaceae	Leaves, fruits
III	Magnoliophyta				
A	Magnoliopsida				
4	<i>Chroesthes lanceolata</i> (T.Anderson) B.Hansen	Ô rô trắng	R'por	Acanthaceae	Leaves

5	<i>Dicliptera chinensis</i> (L.) Nees	Lá diển	Duôch da	Acanthaceae	Young shoots, leaves
6	<i>Justicia adhatoda</i> L.	Xuân tiết	Ta briêc	Acanthaceae	Leaves, young shoots, flower
7	<i>Saurauia napaulensis</i> DC.	Sô giả nepal	Rang già	Actinidiaceae	Fruits
8	<i>Amaranthus spinosus</i> L.	Dền gai	Nha rhum	Amaranthaceae	Young shoots, stems
9	<i>Althernanthera sessilis</i> (L.) R. Br.	Rau dệu	Biap l'yông	Amaranthaceae	Young shoots
10	<i>Centella asiatica</i> (L.) Urb.	Rau má	Tờ ne	Apiaceae	Whole plants
11	<i>Oenanthe javanica</i> (Blume) DC.	Cần dại		Apiaceae	Leaves
12	<i>Trevesia palmata</i> (Roxb. ex Lindl.) Vis.	Đu đủ rừng	Plé r'tú	Araliaceae	Fruits
13	<i>Bidens pilosa</i> L.	Đơn buốt	Pài k'nèng sâu	Asteraceae	Young shoots
14	<i>Emilia sonchifolia</i> (L.) DC. ex DC.	Cỏ chua lè	Chạ pòm	Asteraceae	Leaves
15	<i>Gynura crepidioides</i> (Benth.) S.Moore	Rau tàu bay	Biap rodeh par	Asteraceae	Leaves, young shoots
16	<i>Gynura divaricata</i> (L.) DC.	Kim thất tai		Asteraceae	Young shoots, tubers, leaves
17	<i>Spilanthes oleracea</i> L.	Nút áo	Rơ hều	Asteraceae	Leaves
18	<i>Begonia laciniata</i> Roxb.	Hải đường xẻ	Biap tiang ti	Begoniaceae	Leaves
19	<i>Pratia nummularia</i> (Lam.) A.Braun & Asch.	Đơn Rau má	Tờ ne	Campanulaceae	Leaves
20	<i>Euonymus laxiflorus</i> Champ. ex Benth.	Chân danh hoa thừa	Nha tiếp ma	Celastraceae	Leaves
21	<i>Garcinia poilanei</i> Gagnep.	Bứa poilan	Srỗn	Clusiaceae	Leaves, fruits
22	<i>Merremia umbellata</i> (L.) Hallier f.	Bìm tán	Biap lwoat	Convolvulaceae	Leaves
23	<i>Gymnopetalum cochinchinensis</i> (Lour.) Kurz	Cứt quạ	Biap pàng	Cucurbitaceae	Leaves, young shoots
24	<i>Hodgsonia macrocarpa</i> (Blume) Cogn.	Đài hái	Drua	Cucurbitaceae	Leaves, young shoots
25	<i>Momordica cochinchinensis</i> (Lour.) Spreng.	Gấc	Kê ghinh	Cucurbitaceae	Leaves, fruits
26	<i>Trichosanthes cucumerina</i> L.	Dưa núi	Plai kho	Cucurbitaceae	Leaves, fruits
27	<i>Trichosanthes tricuspidata</i> Lour.	Lâu xác	Biap cơ à	Cucurbitaceae	Young shoots
28	<i>Diospyros nitida</i> Merr.	Thị vuông	Chi Blon	Ebenacae	Fruits
29	<i>Vaccinium iteophyllum</i> Hance	Nen lá liễu	Biap K'siu	Ericaceae	Leaves

30	<i>Antidesma ghaesembilla</i> Gaertn.	Chòi mòi	Snrèt	Euphorbiaceae	Leaves, fruits
31	<i>Claoxylon hainanense</i> Pax & K.Hoffm.	Lộc mại nhỏ	Bia Ru	Euphorbiaceae	Leaves
32	<i>Glochidion daltoni</i> (Muell.-Arg.) Kurz.	Sóc dalton	Chi durec	Euphorbiaceae	Leaves
33	<i>Phyllanthus emblica</i> L.	Me rừng	L'híel	Euphorbiaceae	Fruits
34	<i>Indigofera longicauda</i> Thuan	Chàm đuôi dài	Dòng pơ kao bồ	Fabaceae	Leaves
35	<i>Elsholtzia blanda</i> (Benth.) Benth.	Kinh giới núi		Lamiaceae	Leaves
36	<i>Litsea cubeba</i> (Lour.) Pers.	Màng tang	Nha lâu lor	Lauraceae	Fruits
37	<i>Barringtonia pauciflora</i> King	Chiếc ít hoa	Nha lơ bor	Lecythidaceae	Leaves
38	<i>Abelmoschus moschatus</i> Medik.	Vông vang	I am ring	Malvaceae	Young shoots, leaves, flowers
39	<i>Medinilla spirei</i> Guillaumin	Mua leo	Biap a tiêr	Melastomataceae	Leaves
40	<i>Albizia attopeuensis</i> (Pierre) I.C.Nielsen	Dây cai	Chi còr kas	Mimosaceae	Leaves
41	<i>Ficus abelii</i> Miq.	Sung chè	Chi ơ rê	Moraceae	Fruits
42	<i>Ficus hispida</i> L.f.	Ngái	Sâr	Moraceae	Fruits
43	<i>Musa uranoscopus</i> Lour.	Chuối rừng	Chi Ju	Musaceae	Stems, flowers, fruits
44	<i>Myrica esculenta</i> Buch.-Ham. ex D. Don	Dâu rượu	Kréh	Myricaceae	Fruits
45	<i>Ardisia mirabilis</i> Pit.	Cơm nguội lạ	Plé Sờ nò muh	Myrsinaceae	Fruits
46	<i>Embelia ribes</i> Burm.f.	Chua ngút	Snràì	Myrsinaceae	Leaves
47	<i>Cleistocalyx operculatus</i> (Roxb.) Merr. & L.M.Perry	Vối	Kriêng	Myrtaceae	Leaves
48	<i>Syzygium zeylanicum</i> (L.) DC.	Trâm đỏ vỏ	Kriêng	Myrtaceae	Fruits
49	<i>Olex scandens</i> Roxb.	Dương đầu leo	Biap krit	Olacaceae	Young shoots
50	<i>Passiflora foetida</i> L.	Lạc tiên	Tom bơ ồm	Passifloraceae	Young shoots, leaves
51	<i>Pentaphragma honbaense</i> (A.Chev. & Gagnep.) Gagnep.	Mồng toi núi	Rơ wêh	Pentaphragmataceae	Leaves
52	<i>Piper sarmentosum</i> Roxb.	Lá lốt	Kri ble	Piperaceae	Leaves
53	<i>Monochoria vaginalis</i> (Burm.f.) Presl	Mác bao	Cré	Pontederiaceae	Leaves, young shoots

54	<i>Portulaca oleracea</i> L.	Rau sam	Chung a da	Portulacaceae	Leaves
55	<i>Helicia nilagirica</i> Bedd.	Quần hoa	Chi ngôm	Proteaceae	Leaves
56	<i>Rhus javanica</i> var. <i>roxburghii</i> (DC.) Rehder & E.H.Wilson	Muối	Cor cò	Rosaceae	Fruits, leaves
57	<i>Mussaenda hoaensis</i> Pierre ex Pit.	Bướm bạc biên hòa	R'má	Rubiaceae	Leaves
58	<i>Rubia philippinensis</i> Elmer	Vấn vương đà lạt	Dong giềng	Rubiaceae	Tubers
59	<i>Solanum nigrum</i> L.	Lu lu đực	Kloan	Solanaceae	Young shoots
60	<i>Solanum torvum</i> Sw.	Cà đại hoa trắng	Prền jùn	Solanaceae	Fruits
61	<i>Solanum violaceum</i> Ortega	Cà đắng	Prền	Solanaceae	Fruits
62	<i>Symplocos cochinchinensis</i> var. <i>laurina</i> (Retz.) Noot.	Dung nam lá trà	Chi n'ha ce	Symplocaceae	Leaves
B	<i>Liliopsida</i>				
63	<i>Schismatoglottis calyptata</i> (Roxb.) Zoll. & Moritzi	Ráy thon	R' tó	Araceae	Leaves, stems
64	<i>Calamus bousigonii</i> Becc.	Mây lá rộng	Gòl	Arecaceae	Young shoots
65	<i>Dioscorea cirrhosa</i> Lour.	Củ nâu	Bum chơ ninh	Dioscoreaceae	Tubers
66	<i>Dioscorea opposita</i> Thunb.	Củ mài	Bum pré	Dioscoreaceae	Tubers
67	<i>Pandanus multirupaceus</i> H.St.John	Dứa rừng	Sra	Pandanaceae	Fruits
68	<i>Bambusa procera</i> A.Chev. & A.Camus	Măng lồ ô	Nha păng	Poaceae	Young shoots
69	<i>Alpinia conchigera</i> Griff	Riềng rừng	Bru kđó	Zingiberaceae	Flowers, roots
70	<i>Curcuma aromatica</i> Salisb.	Nghệ rừng	Cal ngai	Zingiberaceae	Leaves, young shoots, tubers
71	<i>Hedychium coronarium</i> J.Koenig	Ngải tiên	Pang lar	Zingiberaceae	Leaves
72	<i>Zingiber rubens</i> Roxb.	Gừng đỏ	Pruh lênh	Zingiberaceae	Leaves
73	<i>Zingiber zerumbet</i> (L.) Roscoe ex Sm.	Giềng gió	Pruh	Zingiberaceae	Leaves, flowers

Species-rich families were represented by Asteraceae, Cucurbitaceae, Zingiberaceae (5 species each); Euphorbiaceae (4 species); While Acanthaceae, Solanaceae, Myrsinaceae (3 species each); Dioscoreaceae, Rubiaceae, Myrtaceae, Moraceae, Apiaceae (2 species each), and 34 families of single species. Species-rich genera were represented by *Solanum* (3 species); meanwhile Zingiber, Dioscorea, Ficus, Trichosanthes, Gynura (2 species each); and 59 genera of single species.

3.1.2. diversity of edible plant life forms

We have recorded nine life forms as food for the K'Ho people. This result is consistent with the study in Nam Ban forest, Lam Dong province by Hop et al. (2020) (with ten life forms) [4]. In the present study, the most diverse with 28 species (38.36%)

was found in herbaceous plants; followed by vines of 13 species (17.81%); Shrubs 12 species (16.44%); at least epiphytes and bamboo with the same species (1.37%). Through the life-form of plants were used by local communities, we found that the local people's method of using resources was very sustainable.

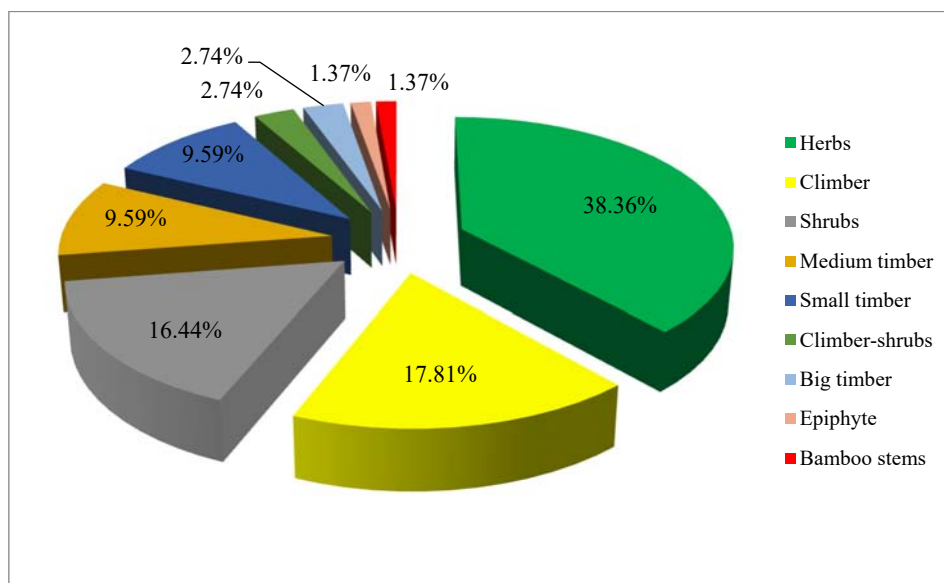


Figure 2. Diversity of life-forms of edible plants

Life forms could explain this: herbs, vines, shrubs are small, annual life forms that were mainly spread under the canopy of the forest. Therefore, when used, it did not affect the forest canopy structure while still ensuring its use in the following (annual) harvests. The life form is the long-term adaptation of an organism to the environment. The analysis of plant life forms helps us to align their cultivation, exploitation, and use appropriately [13].

3.1.3. variety of parts usage

A total of 8 parts of the plant were used as food by the K'Ho people (Table 2).

Table 2. Variety of used parts of edible plant

No.	Parts	No. of species	Percentage
1	Leaves	46	63.01
2	Fruit	23	31.51
3	Shoot	20	27.40
4	Tuber	7	9.59
5	Flower	6	8.22
6	Root	5	6.85
7	Stem	3	4.11
8	Whole plant	1	1.37

Note: A species can use many different parts

Among them, leaves are the most common part with 46 species (63.01%), while the whole is used with only one species (1.37%). This showed that the K'Ho community knows how to use resources sustainably. After all, the use of leaves of the plant

almost does not affect the growth and development of plants. In addition, it does not influence the properties, species composition, and structure of the forest.

3.1.4. diversity of habitat

Investigation of the living environment of edible plants as a basis for selecting high-quality species for domestication and planting in home gardens to meet the increasing trend of using clean forest vegetables by the locals. It also reduces the pressure on forest resources and has important implications for the conservation of forest resources.

Table 3. Distribution of edible plants by habitat

No.	Habitat	No. of species	Percentage
1	Primary forest	43	58.90
2	Secondary forest	33	45.21
3	Pine forest	16	21.92
4	Swamp	3	4.11
5	Bamboo forest	1	1.37

Note: One species distributed many different habitats

The edible plant species have been identified for distribution in 5 different habitats. Most of the species in the evergreen forest with 76 species (105.56%), the remaining species are in the pine, swamp, and bamboo forest. In particular, these species are most widespread in the primary forest 43 species (58.90%), followed by the secondary forest 33 species (45.21%), pine forest 16 species (21.92%), swamp three species (4.11%), the lowest bamboo forest (1.37%) (Table 3).

3.2. Culinary, cultural diversity in the use of edible plant species

3.2.1. Indigenous knowledge of edible plant species by age

Through interviews with 99 people to provide information, including 33 people between the ages of 18 and 30, 33 people between 31 and 60, and 33 people over 60 years have shown the "disappearance" of indigenous knowledge about edible plants by age (Table 4).

Table 4. Indigenous knowledge of edible plants of the K'Ho ethnic group by age

No.	Age	No. of people	No. of species	Percentage
1	18-30 age	33	10	13.70
2	30-60 age	33	23	31.51
3	Over 60 age	33	40	54.79
Total		99	73	100

A total of 40 species were used as food by the elderly (54.79%), followed by the 30-60-year-old age group (23 species) and the lowest among the under 30 years old group (10 species). Many factors can influence this result, such as the respondent's memory, economic and social status, level of education, etc. However, this finding also poses a challenge for the local population to maintain an understanding of the use of edible plants.

3.2.2. Indigenous knowledge of food type groups

Local people's knowledge of food species groups is shown in Table 5.

Table 5. The diversity of food species groups

No.	Food groups	No. of species	Percentage
1	Cook soup, vegetables	55	75.34
2	Fruits	17	23.29
3	Spice	9	12.33
4	Salt pickle	7	9.59
5	Water to drink	6	8.22
6	Alcohol yeast	4	5.48
7	Food dyes	4	5.48
8	Flower	4	5.48
9	Starch	2	2.74

Note: A species has many different food groups

Based on the knowledge and experience of the locals, we have identified nine groups of species that were used as food by the K'Ho. Cooking soup, preparing vegetables is the most common group of species used by the locals with 55 species (75.34%), followed by the fruit group with 17 species (23.29%), the lowest was the starch group with two species (2.74%).

3.2.3. Indigenous knowledge of food processing methods

We found that cooking soups were the most common way of preparing food for the K'Ho people with 47 species (64.38%), followed by boiling 35 species (47.95%), eating 23 species raw (31.51%), the stir-fry 17 species (23.29%), the rest from 1 to 7 species (1.37% -9.59%) (Table 6).

Table 6. Diversity of food processing methods

No.	Processing	No. of species	Percentage
1	Cook a soup	47	64.38
2	Boiled	35	47.95
3	Eat fresh	23	31.51
4	Stir-fried	17	23.29
5	Salted vegetables	7	9.59
6	Chopped	7	9.59
7	Cook with sauce	2	2.74
8	Grill	2	2.74
9	Pickled wine	1	1.37
10	Fry	1	1.37

Note: A species has many different ways of processing food

This demonstrated the suitability of the culinary culture of the Vietnamese people. In which the soup was considered an indispensable dish in the daily meals. Because this is a dish with a multitude of nutrients, rich in processing and rich in flavour, wild plants were the main components of the soup were collected from natural forests, no pesticides were used, so the user's health was not affected.

3.2.4. Some edible plants are grown by K'Ho people

A total of eight species of edible native plants were grown as food in the garden of the K'ho people: *Solanum violaceum* (Cà đắng-Prền), *Amaranthus spinosus* (Dền gai-Nha rhum), *Zingiber zerumbet* (Giềng giò-Pruh), *Zingiber rubens* (Gừng đỏ-Pruh lênh), *Bambusa procera* (Măng lồ ô-Nha păng), *Curcuma aromatic* (Nghệ rừng-Cal ngai), *Ficus hispida* (Ngái-Sâr), *Ficus abelii* (Sung chè-Chi ơ rê). The most famous tree in particular "Prền" (*Solanum violaceum*).

IV. CONCLUSIONS

Edible plants were used as food by the K'ho people in the Bidoup-Nui Ba National Park and are very diverse and abundant. The locals have a deep understanding of the life forms, the parts used, and the environment in these edible plants are distributed. Also, the K'ho have an abundant, rich, and unique understanding of using and processing food to create typical dishes with the culinary culture that other communities do not have. Moreover, they have practical experience in domesticating and cultivating valuable edible plants for daily nutrition while reducing the pressure on the forest resources in which they live. This knowledge and experience depend on age; young and middle-aged people have less experience and understanding of edible plants than older people. This demonstrated the challenges of the loss of knowledge about crop use in particular and indigenous knowledge in general of the K'ho people for objective and subjective reasons.

ACKNOWLEDGMENT

This study was carried out with the help and support of field research and provided information from the K'ho community and students: Pham Do Ni, Nguyen Thanh Tu, K Broi. Many thanks to the colleagues who participated in the comment and gave me many ideas for the manuscript of this article.

REFERENCES

- [1] S. Tagane, N. V. Ngoc, H. T. Binh, A. Nagahama, M. Zhang, T. Q. Cuong, L. V. Son, D. V. Son, H. Toyama, N. U. Komada, H. Nagamasu and T. U. Yahara, "Fifteen New Species of Angiosperms from Bidoup-Nui Ba National Park, Southern Highlands of Vietnam", *Acta Phytotax Geobot* 71(3), pp. 201–229, 2020. doi: 10.18942/apg.202002
- [2] L. V. Son, A. S. Curry, T. Q. Cuong, "Camellia flosculora: a new species of Camellia section Thea series Sinenses (Theaceae) from Vietnam Brittonia", 2021. <https://doi.org/10.1007/s12228-020-09646-5>.
- [3] W. L. Che, C. H. Tian, H. L. Truong, L. P. T. N. Ich, Y. A. Y. Tsung and W. L. Chia, "Revision of Begonia (Begoniaceae) in Bidoup-Nui Ba National Park, Southern Vietnam, Including Two New Species", *Phytotaxa*, 496(1) pp. 77–89, 2021. DOI: 10.11646/phytotaxa.496.1.4
- [4] N. V. Hop, B. M. Hung, N. T. Ha, P. V. Hoang, "Composition of edible plant species used as food by the k'ho community: A case study in Nam Ban protection forest, Lam Dong province" [Thành phần loài thực vật ăn được sử dụng làm thực phẩm của cộng đồng K'ho: Nghiên cứu điểm tại rừng phòng hộ Nam Ban, tỉnh Lâm Đồng], *Journal of Forestry science and Technology*, No. 4, pp. 97-107, 2020.
- [5] L. V. Son, "Study on indigenous knowledge in the management and use of forest resources of the K'ho people in Bidoup - Nui Ba National Park, Lam Dong Province" [Nghiên cứu tri thức bản địa trong quản lý sử dụng tài nguyên rừng của người K'ho tại Vườn Quốc gia Bidoup-Núi Bà, tỉnh Lâm Đồng], Master Thesis, Forestry University, Hanoi, Vietnam, pp, 81, 2012.
- [6] G. J. Martin, *Ethnobotany: A methods manuals* Chapman & Hall, London, 1995.
- [7] P. H. Ho, *Vietnamese plants [Cây co Viet Nam]*, (Vol. 1, 2, 3). Ho Chi Minh City: Youth Publisher, 1999-2003.
- [8] T. D. Ly, *1,900 useful plant species of Vietnam*. Hanoi: World Publisher, 1993.
- [9] T V Hung (ed.), *Non-timber forest products in Vietnam* Agricultural Publishing House, Hanoi, Vietnam, 2007 [in Vietnamese].
- [10] Plants of the World Online, <<http://www.plantsoftheworldonline.org>> Accessed July 2021.
- [11] World flora online, <<http://104.198.148.243>> Accessed July, 2021
- [12] R. K. Brummitt, *Vascular Plant families and genera* Royal Botanic Gardens, Kew, 1992

- [13] N. V. Hop, "Plants composition used in traditional food by Cho Ro community in Dong Nai Culture Nature Reserve, Dong Nai province" [Thành phần loài thực vật được sử dụng làm thức ăn của cộng đồng Chơ Ro tại Khu Bảo tồn thiên nhiên - Văn hóa Đồng Nai, tỉnh Đồng Nai]. *Journal of Forestry science and Technology*, No. 1, pp. 103-112, 2018.